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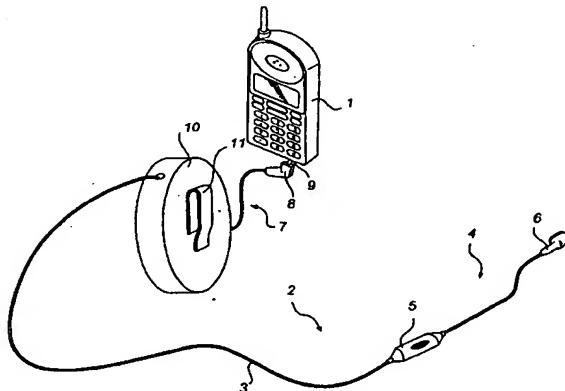
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(54) Title: DEVICE IN HANDS-FREE EQUIPMENT FOR MOBILE PHONES AND ACCESSORIES COMPRISING SUCH A DEVICE



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(57) Abstract: A device in hands-free equipment (2) for mobile phones (1), comprising a collecting means (28) arranged in a casing (10) and adapted to collect a wire (3) of said equipment (2), said wire extending between a first wire end (4) and a second wire end (7). The collecting means (28) is arranged for such collection of said wire (3) that its wire ends (4, 7) in the collected state of the wire (3) are positioned outside the casing (10). A first wire portion (P1) connecting to the first wire end (4) and constituting a main part of the wire (3) is dischargeable from the casing (10) by pulling out said first wire end (4). The device is characterised by a spring means (33) which is activatable by pulling out the first wire end (4) and which in its activated state acts on a reeling means (29) included in the collecting means (28) and intended for recollecting the wire (3), a locking means (32) which acts to lock the wire (3) in its pulled-out state, and a fastening means (11) arranged on the outside of the casing (10) and intended for mounting the device on a suitable base. The locking means is, in connection with a further moderate pulling-out of the first wire end (4), adapted to release the wire (3). The present invention also relates to use of such a device and an accessory comprising such a device and hands-free equipment (2).

DEVICE IN HANDS-FREE EQUIPMENT FOR MOBILE PHONES AND
ACCESSORIES COMPRISING SUCH A DEVICE

Field of the Invention

The present invention relates to a device in hands-free equipment for mobile phones, use of such a device and an accessory for mobile phones, comprising such a device and hands-free equipment. More specifically, the invention concerns such a device comprising a collecting means arranged in a casing and intended to collect a wire, extended between a first wire end and a second wire end, of said equipment.

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Background Art

As a rule, hands-free equipment comprises an earpiece and a mouthpiece, which via a wire are connected to a mobile phone. When using the equipment, the earpiece is placed in the user's ear, the mouthpiece being arranged at such a distance from the earpiece as to be placed in a position adjacent to the user's mouth.

The hands-free equipment renders it possible for the user to make a phone call without using his hands.

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Mobile phones emit microwaves which, it is feared, can be harmful to the user. Using hands-free equipment, it will be possible for a user to make a phone call without having to apply the actual phone to his head, which will thus not be exposed to said microwaves.

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However, the hands-free equipment may be inconvenient when the mobile phone is not being used. The wire takes up some space and besides can get entangled and make a knot, which of course renders the subsequent use difficult.

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A solution to this problem is described, for example, in patent application WO99/60764. This describes a first type of device, in which a wire of hands-free equipment is unwindably collected in a casing.

When using the phone, the wire of the hands-free equipment is pulled out from the casing and after the call has been ended, it is again collected in the casing.

However, this prior art device suffers from several problems. The wire has a wire end which is located in the casing and which via a trailing contact is connected to a contact means connectable to the mobile phone. This rather complicated arrangement for connecting the device to a mobile phone results in the device being relatively expensive. Nor is it possible to use the device together with existing, conventional hands-free equipment.

A second type of device is disclosed in US-5,684,883. This device solves some of the above problems and comprises a casing, in which a wire of hands-free equipment is windable by means of a winding mechanism. In the wound-on state of the wire, its wire ends are arranged outside the casing. A described embodiment of the prior art device comprises a spring means which acts to wind on the pulled-out wire and a locking means which acts to lock the wire in its pulled-out state. The locking means comprises a spring-loaded arm which engages a gear wheel and which must be actuated to release the gear wheel, thereby making the spring means capable of acting to wind on the wire. This construction involves a number of drawbacks. First, the arm engages the gear wheel during unwinding of the wire which, of course, causes disadvantageous wear on the gear wheel, thus decreasing its service life. Furthermore the gear wheel is released by the arm being actuated and, more specifically, a button is pressed to cause said actuation. It will be appreciated that there is a great risk of unintentional actuation of the arm and, thus, unintentional winding-on of the wire when handling the prior art device, for instance when keeping it in a trouser pocket. Moreover, the prior art device is rather complicated to handle in connection with the unwinding and winding-on of the wire.

Summary of the Invention

An object of the present invention is to provide an improved device in hands-free equipment, said device being of the second type described above. In particular the 5 device should allow adequate handling of the hands-free equipment and besides also allow easy connection to a mobile phone. It should also be possible to use the device together with existing, conventional hands-free equipment. The device should also be easy to handle and 10 preferably have a long service life.

A second object of the present invention is to provide use of the above device which allows efficient, directed marketing.

15 A further object is to provide an accessory for mobile phones, which allows easy handling of hands-free equipment included in the accessory.

According to the present invention, the first object is achieved by a device having the features defined in claim 1. Preferred embodiments of the device are apparent 20 from claims 2-14.

To achieve the second object, use of a device as described above is provided according to claim 15.

According to the present invention, the third object is achieved by an accessory having the features defined 25 in claim 16. Preferred embodiments of the accessory are apparent from claims 17 and 18.

More specifically, according to the present invention a device in hands-free equipment for mobile phones is provided, comprising a collecting means arranged in a 30 casing and adapted to collect a wire of said equipment, said wire extending between a first wire end and a second wire end, the collecting means being arranged for such collection of said wire that its wire ends in the collected state of the wire are positioned outside the casing, and a first wire portion connecting to the first wire end and constituting a main part of the wire being 35 dischargeable from the casing by pulling out said first

wire end, said device being characterised by a spring means which is activatable by pulling out the first wire end and which in its activated state acts on a reeling means included in the collecting means and intended for 5 recollecting the wire, a locking means which acts to lock the wire in its pulled-out state, and a fastening means arranged on the outside of the casing and intended for mounting the device on a suitable base, the locking means being adapted to release the wire in connection with a 10 further moderate pulling-out of the first wire end.

This results in an improved device in hands-free equipment. When the wire of the hands-free equipment is collected in the inventive device, both ends of the equipment are still arranged outside the casing of the 15 device, thereby easily allowing connection of the hands-free equipment to a mobile phone while using a conventional contact means of the hands-free equipment. When using the mobile phone, a main part of the wire is dischargeable from the casing by pulling out a first wire 20 end, which normally comprises the mouthpiece and the ear-piece of the hands-free equipment. As a result, the necessary wire length is ensured when using the equipment. The device can also be used by one-handed operation and will thus be extremely simple to use. In fact, the 25 device is arranged on a suitable base with the aid of the fastening means, thereby allowing pulling-out of said first wire end using one hand only. The locking means ensures that the wire is locked in its pulled-out state. In connection with the winding-on of the wire, said first 30 wire end is pulled out a little more - again using one hand only. The locking means releases the wire, whereby the spring means can act to wind on the wire. The user can as a natural part of the motion, his hand seizing the first wire end, accompany the wire as it is being wound 35 on. This ensures that the wire is handled with care and is not wound on in an uncontrolled manner with the ensuing risk of damage.

The casing of the inventive device is preferably openable, the device in the open state of the casing being applicable to said wire. Thus, the device can easily be mounted on the wire of existing, conventional hands-free equipment.

According to a preferred embodiment of the inventive device, the locking means comprises a turnably mounted locking arm, which after completed pulling-out of said wire end and under the action of gravity is turnable to an engaging position for locking the wire in its pulled-out state, and which by the further moderate pulling-out of said wire end is turnable from said engaging position to allow said recollection of the wire, said locking arm, during said recollection of the wire and under the action of centrifugal force, being retained in a position turned away from said engaging position.

According to another preferred embodiment of the present invention, the collecting means, in response to pulling-out of said first wire end, is adapted to discharge the second wire end and a second wire portion connecting thereto and constituting a smaller part of the wire. By also the second wire end being discharged when pulling out the first wire end, the risk of the wire being twisted is eliminated, which of course has a positive effect on its service life.

The collecting means advantageously comprises a first and a second reeling surface for winding on the first wire portion and the second wire portion respectively, the first reeling surface being adapted to act to wind on the first wire portion at a greater diameter than the diameter at which the second reeling surface is adapted to wind on the second wire portion. Since the first reeling surface acts at a greater diameter, for each revolution a longer wire portion will be wound round the first reeling surface than on the second reeling surface. When pulling out the first wire end, the first wire portion will thus be unwound from the first reeling sur-

face and discharged from the casing. At the same time the second wire portion will be unwound from the second reeling surface and discharged from the casing. This results in a device where the risk of twisting of the wire is 5 eliminated while pulling-out of the first wire end is allowed to the necessary extent.

According to one more preferred embodiment of the present invention, the device comprises a fastening means which is arranged outside the casing and intended for 10 mounting the device on a suitable base. As a result, it will be possible to fasten the device, for example, on the inside pocket of a jacket or the dashboard of a vehicle. The fastening means may comprise, for example, a clip or a Velcro fastener. The fastening means can also 15 be adapted to allow turnable mounting of the device.

According to a further preferred embodiment of the invention, the casing of the device is essentially cylindrical and comprises a base part and a lid connectable thereto, an opening for each wire end being formed in the 20 circumferential surface of the casing. Thus the device can be mounted on a wire of hands-free equipment by removing the lid of the casing so as to reach the reeling means, through which the wire is pulled in a suitable fashion. The collecting means may comprise a first pulley 25 which supports a first cylindrical reeling surface, and a second pulley which supports a second cylindrical reeling surface, the pulleys being arranged round the longitudinal axis of the casing and the first reeling surface having a diameter which is greater than the diameter of 30 the second reeling surface.

The first pulley is preferably rotatably mounted round said longitudinal axis and connected to a spring means, which by rotation of the first pulley in one direction is adapted to act to rotate the pulley in the opposite direction. The first pulley can also support a first circular flange which is radially extended perpendicular from said first reeling surface and which to-

gether with an end portion, connected thereto, of the first pulley forms an end of the first pulley, a through first slot being formed in said end, said slot extending radially from the periphery of the flange to said first 5 reeling surface and subsequently extending along an arc towards the centre for defining a tongue in said end portion. For mounting the device on the wire of hands-free equipment, the wire is thus arranged in such manner in said slot that the wire seizes the tongue. The circular 10 flange ensures that the wire, during winding round the first reeling surface, cannot slide away from the same.

The second pulley advantageously comprises a pin supporting said second reeling surface, said pin being at one end preferably releasably connected to the first 15 pulley and at its other end supporting a circular flange, which prevents the wire from sliding away from the second reeling surface.

Moreover, according to the present invention, also 20 use of a device as described above as a carrier for advertisements is provided, which is applied to an external surface of the casing. This allows efficient and directed marketing.

Finally, according to the present invention, an 25 accessory in connection with a mobile phone is provided, comprising a device as claimed in any one of the above claims and hands-free equipment, the hands-free equipment comprising a wire extended between a first wire end and a second wire end, a mouthpiece and an earpiece being arranged at the first wire end and a means for communication 30 with the mobile phone being arranged at the second wire end.

Said means for communication with the mobile phone 35 preferably comprises a contact means which is connectable to a complementarily formed contact means of said mobile phone.

Alternatively, said means for communication with the mobile phone can be arranged for wireless communication

with said mobile phone. Said means may consist of, for example, an antenna.

A preferred embodiment of the device according to the present invention will now be described by way of 5 example with reference to the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a schematic perspective view of an embodiment of the inventive device together with hands-free 10 equipment and a mobile phone.

Figs 2a and 2b show the device in Fig. 1 together with hands-free equipment in a collected state and in a pulled-out state respectively.

Fig. 3 is a top plan view of base part of an inventive 15 device.

Fig. 4 is a cross-sectional view along line 3-3 in Fig. 3.

Fig. 5 is a top plan view of a lid of an inventive device.

20 Fig. 6 is a cross-sectional view along line 5-5 in Fig. 5.

Fig. 7 is a top plan view of a first pulley of an inventive device.

25 Fig. 8 is a cross-sectional view along line 7-7 in Fig. 7.

Fig. 9 is a top plan view of a second pulley of an inventive device.

Fig. 10 is a side view of the second pulley in Fig. 9.

30 Fig. 11 is a top plan view of a locking means of an inventive device.

Fig. 12 is cross-sectional view along line 11-11 in Fig. 11.

35 Fig. 13 is a top plan view of a pair of locking arms for the locking means in Fig. 11.

Fig. 14 is a schematic cross-sectional view where the components of the inventive device are arranged in order before assembly.

Fig. 15 is a cross-sectional view of the device in 5 the assembled state.

Fig. 16 is a schematic perspective view, in exploded form, of a device according to the invention.

Description of Embodiments

10 Fig. 1, to which reference is now made, illustrates a device according to the present invention together with a mobile phone 1 and hands-free equipment 2.

15 The hands-free equipment 2 is of a conventional type with a wire 3, at whose first wire end 4 a mouthpiece 5 and an earpiece 6 are arranged at a distance from each other and at whose second wire end 7 a contact means 8 is arranged. The contact means 8 is connected to a complementarily formed contact means 9 of the mobile phone 1.

20 The device comprises a casing 10 and a collecting means arranged in the casing 10 and adapted to collect the wire 3 of the hands-free equipment 2, said collecting means being shown at 28 in Fig. 16. Moreover, the device comprises a fastening means 11 arranged on its casing 10.

25 The wire 3 of the hands-free equipment 2 is passed through the inventive device in such manner that both wire ends 4, 7 of the wire 3 and the associated mouthpiece 5 and earpiece 6 as well as the contact means 8 project from the casing 10 of device when the wire 3 is collected in the device.

30 The inventive device is arranged with the aid of the fastening means 11 on a suitable base, such as a user's belt or pocket or on the dashboard of a user's car. The fastening means 11 consists in the shown embodiment of a clip, but it will be appreciated that other fastening means, such as Velcro fasteners or magnets, are also conceivable. The fastening means 11 can also be arranged

in such manner as to allow turnable mounting of the device on a base.

When using the mobile phone 1, a user seizes the first wire end 4 of the wire 3 and pulls out the wire 3 to 5 the desired extent, whereupon the wire 3 is locked in this position with the aid of a locking means (not shown).

The fact that the device is fixed to a base with the aid of said fastening means 11 makes it possible for the user to pull out said first wire end 4 using one hand.

10 This is extremely advantageous in many situations, for instance, when receiving a phone call while driving a car. The user can pull out the wire end 4 with his one hand to lock the wire 3 in the pulled-out state and arrange the earpiece 6 in his ear and then carry out a 15 call using said mouthpiece 5 and earpiece 6. After the call has been ended, the wire 3 is released and can once more be pulled in and collected in the casing 10.

The locking means is adapted to assist this one-handed operation of the device. In particular the locking 20 means is arranged in such manner as to cause, without any measure being taken by the user, the locking of the wire 3 in its pulled-out state. The locking means is also designed in such manner that the release of the wire 3 can be effected using one hand. A thus designed locking means 25 will below be described in more detail with reference to Figs 3-12.

Figs 2a and 2b illustrate the device shown in Fig. 1 together with hands-free equipment 2 in a collected and a discharged state respectively. As is evident from Fig. 30 2a, both end 4, 7 of the wire 3 are arranged outside the casing 10 in the collected state of the wire 3. This allows easy access to the first wire end 4, which, as described above, comprises the mouthpiece 5 and the earpiece 6, and connection of a contact means 8 of the second wire end 7 to a mobile phone 1. As seen in Fig. 2b, a first wire portion P1, which constitutes a main part of the wire 3, is dischargeable by the first wire end 4

being pulled out. This ensures that the necessary length of wire is obtained for adequate handling of the hands-free equipment 2. However, the second wire end 7 and a wire portion P2 connecting thereto and constituting a
5 smaller part of the wire 3 will be discharged from the casing 10 in response to said pulling-out of the first wire end 4. By this discharging of the second wire end 7 and the connecting second wire portion P2, the risk of twisting the wire 3 during pulling-out of the first wire
10 end 4 and the connecting first wire portion P1 is eliminated, which of course reduces the risk of cable break in the wire 3 and, thus, has a positive effect on the service life of the hands-free equipment 2.

Thus the inventive device is extremely suitable for
15 use together with conventional hands-free equipment 2.

More specifically, the device comprises said collecting means 28, which will be described in more detail below and which allows said pulling-out of the first wire end 4 with the mouthpiece 5 and the earpiece 6 while at
20 the same time the second wire end 7 is discharged, the collecting means also ensuring that the second wire end 7 is discharged to a considerably smaller extent than the extent to which the first wire end 4 is pulled out. Since both wire ends 4, 7 are discharged, twisting of the wire
25 3 inside the casing 10 is thus avoided, thereby ensuring a satisfactory service life of the equipment 2. By the discharge of the second wire end 7 being significantly smaller than the discharge of the first wire end, it is also ensured that the first wire end 4 can be pulled out
30 to the required extent.

It will be appreciated that the inventive device can also be used together with hands-free equipment which is not intended for direct connection to a mobile phone. The contact means of the hands-free equipment can then be replaced by an antenna for wireless communication with the mobile phone.

Figs 3-12, to which reference is now made, illustrate various components of a device of the type shown in Fig. 1.

The device thus comprises a cylindrical casing 10 in 5 which a collecting means 28 is arranged. Moreover the device comprises a fastening means 11 (not shown), for instance of the type which has been described with reference to Fig. 1.

The casing 10 comprises a base part 12 shown in Figs 10 3 and 4 and a lid shown in Figs 5 and 6, which is connectable to the base part 12 by means of a circumferential snap lock 14a and 14b, respectively, which is peripherally formed on the base part 12 and the lid 13 respectively.

15 The base part 12 has a cup-shaped bottom 15 and a cylindrical wall 16. A cylindrical projection 18 is centrally arranged on the inside of the bottom 15. The projection 18 has a radially extended spring recess 19 and an annular shoulder 20 at the end of the projection 20 18 facing away from the bottom 15. Circumferentially uniformly distributed recesses 21 are formed in said shoulder 20. At the end of the projection 18 facing away from the bottom 15 also a centre hole 22 is formed. An opening 23 is finally formed in the wall 16 of the base part 12.

25 The lid 13 has a centrally arranged circular recess 24. An opening 25 and a notch 26 connecting therewith are formed in the wall 27 of the lid 13.

30 The collecting means 28 comprises a reeling means, which is shown in Fig. 16 at 29 and comprises a first pulley 30 shown in Figs 7 and 8 and a second pulley 31 shown in Figs 9 and 10, a locking means 32 shown in Figs 11, 12 and 13 and a spring means which is shown in Fig. 16 at 33.

35 The first pulley 30 has a cylindrical part 34 which at a first end 35 is sealed by an end portion 36 having a centre through hole 37 and, surrounding the same, a bearing recess 38. Two smaller through holes 39 are formed on

each side of the centre hole 37. A first circular flange 40 is further arranged at said first end 35 of the cylindrical part 34. A second flange 41 is arranged at a distance from the first flange 40. The portion, extending 5 between the flanges 40, 41, of the part 34 forms a first reeling surface 42. A first through slot 43 is formed in the first flange 40 and in the end portion 36, connecting therewith, of the cylindrical part 34. The slot 43 extends from the periphery of the flange 40 radially inwards, after which the slot 43 curves and extends along 10 the periphery of the cylindrical part 34 so as to finally bend towards the centre. The slot 43 thus defines a tongue 44 in the end portion 36. Moreover a second slot 45 is cut in the underside 46 of the end portion 36. This 15 second slot 45 forms a radially extended extension of that part of the first slot 43 which extends radially inwards from the periphery of the flange 40.

The second pulley 31 comprises a pin 47 which at its one end supports a circular flange 48. A circular projection 49 is centrally arranged on the top face 50 of the flange 48.

The locking means 32 is adapted to lock a wire (not shown) of hands-free equipment in the pulled-out state of the wire without having to be actuated by a user, and to release the wire by continued moderate pulling-out of the wire. To this end, the locking means 32 comprises in the embodiment shown a circular flange 51 with a centrally through-going, circular hole 52. Two studs 53 are arranged on the top face 54 of the flange 51 on opposite 25 sides of the hole 52 and a spring pin 52 is arranged on the underside 56 of the flange 51. The two studs 53 on the top face 54 of the flange 51 are intended to support 30 a turnably arranged locking arm 57 each.

The components included in the inventive device are 35 preferably made of plastic material except for the spring means 33 and the locking arms 57. The spring means 33 is preferably made of a spring steel material while the

locking arms 57 are preferably made of a metallic material.

Figs 14 and 15, to which reference is now made, are a cross-sectional view of the device in a state before 5 mounting and a cross-sectional view of the device in its mounted state.

The mounting of the device is carried out in such manner that the components included in the device are put together and arranged concentrically round a longitudinal axis 63 of the casing 10. More specifically, a first end 10 of the spring means 33, which first end is shown at 58 in Fig. 16, is inserted into the spring recess 19 of the base part 12, whereupon the spring means 33 is arranged on the outside of the projection 18 of the base part 12. A second end of the spring means 33, which second end is 15 shown at 59 in Fig. 16, is hooked into the spring pin 55 of the locking means 32, which is arranged on top of the spring means 33. The projection 18 of the base part 12 will extend through the hole 52 of the locking means 32. Subsequently the first pulley 30 is arranged over the package formed of the locking means 32 and the spring means 33. This package is inserted more specifically into 20 a space 60 defined in the cylindrical part 34 of the first pulley 30, the studs 53 on the top face 54 of the flange 51 of the locking means 32 being inserted into the smaller holes 39 in the end portion 36 of the cylindrical part 34. The free end, extended from the shoulder 20, of 25 the projection 18 of the base part 12 will further be inserted into the bearing recess 38 of the first pulley 30. Furthermore the base part 12 has an annular projection, 30 with which an annular outer shoulder of the cylindrical part 24 of the first pulley 30 engages. This engagement causes axial fixing of the first pulley 30, which facilitates the subsequent assembly and also the mounting of 35 the device on a wire of hands-free equipment. The engagement, however, does not prevent rotation of the first pulley 30. Then the free end of the pin 47 of the second

pulley 31 is inserted into the centre hole 37 of the first pulley 30 and further into the centre hole 22 of the projection 18 of the base part 12. Finally, the lid 13 is connected to the base part 12, whereby the projection 49 of the second pulley 31 is arranged in the bearing recess 24 of the lid 13.

Fig. 16 is a perspective view in exploded form showing how a wire 3 of hands-free equipment 2 is passed through the device.

For mounting the inventive device on a wire 3 of conventional hands-free equipment 2, the lid 13 is removed. The second pulley 31 is preferably detachably arranged on the first pulley 30 to allow removal of the same for satisfactory access in the mounting operation. Subsequently the spring means 33 is prestressed maximally and retained in this prestressed position. Such prestressing is effected by rotating the first pulley 30, which is connected with the spring means 33 via the locking means 32, in a direction that is necessary for prestressing of the spring means 33. It is ensured that the slot 43 in the first flange 40 of the first pulley 30 is oriented relative to the opening 23 in the wall 16 of the base part 12. Then the wire 3 is inserted into the opening 23 and passed along the slot 43 in the first flange 40 and in the end portion 36, connected therewith, of the cylindrical part 34. It is ensured that the wire 3 is passed down through the slot 43, past the tongue 44 formed of the curved part of the slot 43 and into the milled slot 45 in the underside 46 of the end portion 36 of the cylindrical part 34. The wire 3 will thus extend from the opening 23 in the wall 16 of the base part 12, under the radially extended part of the first slot 43 and further in the radial direction in the second slot 45 so as to leave on the top face 61 of the end portion 36 in a position close to the centre. Subsequently the second pulley 31 and the lid 13 are mounted once more, while it

is ensured that the wire 3 leaves through the opening 25 in the lid 13.

Then the spring means 33 is released from its prestressed position. The first pulley 30 will be caused 5 to rotate, which means that the first wire portion P1 projecting from the opening 23 of the base part 12 will be wound round the reeling surface 42 of the first pulley 30 and that the second wire portion P2 extending from the opening 27 of the lid 13 will be wound round the second 10 reeling surface 62 formed of the pin 47 of the second pulley.

In the subsequent use of the mobile phone 1, the user seizes the wire end 4 which comprises the mouthpiece 5 and the earpiece 6 and pulls it out. The spring means 15 33 will be stressed, which allows subsequent winding-on once more.

The locking means 32, however, allows locking of the wire end 4 in the pulled-out state. This is achieved by the turnably mounted locking arms 57, which under the 20 action of gravity are movable to an engaging position, in which they engage in the recesses 21 in the projection 18 of the base part 12. The locking arms 57 are formed in such manner as to engage in the recesses 21 for locking if the first pulley 30 is rotated for winding on the 25 first wire end 4. Thus, pulling-out of said wire end 4 is allowed. The locking arms 57 are turnably mounted round the studs 53 and are thus not spring-loaded, whereby the locking arms 57 do not wear on the projection 18 and the recesses 21 formed therein. When the wire 3 is pulled out 30 to the necessary extent, the spring means 33 acts to wind on the wire end 4 once more, said winding-on thus being prevented owing to the engagement of the locking arms 57 in said recesses 21. More specifically, one of the locking arms 57 will under the action of gravity be turned to 35 a position, in which it engages in one of said recesses 21, whereby the locking means 32 locks the wire 3 in the pulled-out state. In order to release the thus locked

wire 3, the pulled-out wire end 4 is subjected to additional, moderate pulling-out, whereby the locking arms 57 are turned away from said engaging position. The spring means 33 will be allowed to act to rotate the first pulley 30 and the locking means 32 connected therewith, the centrifugal force causing the locking arms 57 to be turned outwards round the respective studs 53, thereby preventing renewed engagement and allowing complete winding-on of the wire end 4 and the first wire portion P1 connected therewith.

It will be appreciated that the second wire end 7 and the second wire portion P2 connected therewith will be discharged in connection with the pulling-out of the first wire end 4. The discharge prevents the wire 3 from being twisted while being pulled out. This discharge will, however, be small due to the gear ratio that exists. The gear ratio is caused by the first wire portion P1 being wound round the first reeling surface 42 at a greater diameter than the diameter at which the second wire portion P2 is wound round the second reeling surface 62. By choosing a suitable diameter ratio, it will thus be possible to ensure that that wire portion P1 of the wire 3 which is wound round the reeling surface 42 of said first pulley 30, said wire portion P1 thus adjoining the wire end 4 which comprises the earpiece 6 and the mouthpiece 5 and which is pulled out in connection with use of the mobile phone 1, will be long enough to allow satisfactory handling.

Experiments have shown that the required gear ratio is obtained at a diameter ratio of the first and the second reeling surface in the range 6:1 - 10:1.

The inventive device is intended to be arranged on a suitable base with the aid of a fastening means 11, for instance of the type described with reference to Fig. 1. By the device being fixedly mounted on a base, one hand of the user is sufficient to pull out the wire end 4. The locking means 32 will on its own provide locking of the

wire 3 in the pulled-out state by the engagement of the locking arms 57 in said recesses 21. When the use has been terminated, the wire 3 can again be wound in by an additional, moderate pulling-out of the first wire end 4, 5 again using one hand only. The locking means 32 thus releases the wire 3 which can thus be wound on with the aid of the spring means 33. Thus a device in hands-free equipment is provided, said device allowing efficient and easy use of the hands-free equipment by one-handed operation. It should be specifically noted that the inventive 10 device allows one-handed operation while at the same time the wire 3 is handled with care. This is the case especially when winding on the wire 3. As stated above, the first wire end 4 is pulled out somewhat in order to turn 15 away the locking arms from the engaging position and thus release the wire to allow subsequent winding on. Admittedly, it is possible to quite simply let go of the wire 3 during the winding-on process, but the wire 3 and the associated mouthpiece 5 and earpiece 6 would then be damaged. It is therefore most convenient for the user to 20 keep the wire end 4 and let his hand accompany the wire 3 while being wound on. This eliminates the risk of damage in connection with the winding-on of the wire 3.

It is understood that the present invention is not 25 restricted by the embodiments illustrated.

For instance, it is possible to design said fastening means 11 in some other manner. The fastening means can be designed so as to allow turnable mounting of the device, allowing it to be turned round an imaginary 30 centre axis. As a result, when pulling out the wire end 4 an orientation in the pulling-out direction is provided by the opening 23, through which the first wire end 4 leaves the casing 10, thereby facilitating the pulling-out of the wire end 4.

Moreover the inventive device may comprise a transport locking device for locking the reeling means in the activated state of the spring means. This facilitates the 35

method for mounting the inventive device on the wire of the hands-free equipment. Moreover, when the spring means is released, this causes, as stated above, the reeling means to rotate. When the device is mounted on a wire,
5 the desired winding-on of the wire is achieved. If the spring means is released when the device is not mounted on a wire, there is a great risk of the reeling means being damaged. Thus the transport locking device can eliminate the risk of such detrimental release of the
10 spring means.

The inventive device may further be used in applications other than hands-free equipment.

It is thus possible to use the inventive device together with earpiece equipment for portable music
15 players, such as a portable CD player. The first wire end of a wire of the earpiece equipment may comprise two parallel wire portions each having an earpiece.

The inventive device is also extremely suitable to use for marketing purposes. By applying an advertisement
20 to an external face of the device, efficient exposure is achieved. Conveniently, marketing relates to products or activities associated with the actual inventive device, such as advertisements for telephone operators or mobile phone producers.

25 Several modifications and variations are thus feasible. Consequently the device is defined exclusively by the appended claims.

CLAIMS

1. A device in hands-free equipment (2) for mobile phones (1), comprising
 - a collecting means (28) arranged in a casing (10) and adapted to collect a wire (3) of said equipment (2), said wire extending between a first wire end (4) and a second wire end (7),
 - the collecting means (28) being arranged for such collection of said wire (3) that its wire ends (4, 7) in the collected state of the wire (3) are positioned outside the casing (10), and
 - a first wire portion (P1) connecting to the first wire end (4) and constituting a main part of the wire (3) being dischargeable from the casing (10) by pulling out said first wire end (4),
 - characterised by
 - a spring means (33) which is activatable by pulling out the first wire end (4) and which in its activated state acts on a reeling means (29) included in the collecting means (28) and intended for recollecting the wire (3),
 - a locking means (32) which acts to lock the wire (3) in its pulled-out state, and
 - a fastening means (11) arranged on the outside of the casing (10) and intended for mounting the device on a suitable base,
 - the locking means being adapted to release the wire (3) in connection with a further moderate pulling-out of the first wire end (4).
 2. A device as claimed in claim 1, in which the casing (10) is openable, the device in the open state of the casing (10) being applicable to said wire (3).
 3. A device as claimed in claim 1 or 2, in which the locking means comprises a turnably mounted locking arm (57), which after completed pulling-out of said wire end

(4) and under the action of gravity is turnable to an engaging position for locking the wire (3) in its pulled-out state, and which by the further moderate pulling-out of said wire end (4) is turnable from said engaging position to allow said recollection of the wire (3), said locking arm (57), during said recollection of the wire (3) and under the action of centrifugal force, being retained in a position turned away from said engaging position.

10 4. A device as claimed in any one of claims 1-3, wherein the collecting means (28), in response to pulling-out of said first wire end (4), is adapted to discharge the second wire end (7) and a second wire portion (P2) connecting thereto and constituting a smaller part of the wire (3).

20 5. A device as claimed in any one of the preceding claims, in which the collecting means (28) comprises a reeling means (29) with a first (42) and a second (62) reeling surface for winding on the first wire portion (P1) and the second wire portion (P2) respectively, the first reeling surface (42) being adapted to act to wind on the first wire portion (P1) at a greater diameter than the diameter at which the second reeling surface (62) is adapted to act to wind on the second wire portion (P2).

25 6. A device as claimed in any one of the preceding claims, wherein the fastening means (11) is a clip.

7. A device as claimed in any one of the preceding claims, wherein the fastening means (11) is a Velcro fastener.

30 8. A device as claimed in any one of the preceding claims, wherein the fastening means (11) is a magnet.

9. A device as claimed in any one of the preceding claims, wherein the fastening means (11) is intended for turnable mounting of the device on a suitable base.

35 10. A device as claimed in any one of the preceding claims, in which the casing (10) is essentially cylindrical and comprises a base part (12) and a lid (13) con-

nectable thereto, an opening (23, 25) for each wire end (4, 7) being formed in the circumferential surface of the casing (10).

11. A device as claimed in any one of the preceding 5 claims, in which the collecting means (28) comprises a reeling means (29) with a first pulley (30) supporting a first cylindrical reeling surface (42), and a second pulley (31) supporting a second cylindrical reeling surface (62), the pulleys (30, 31) being arranged round the 10 longitudinal axis (63) of the casing (10) and the first reeling surface (42) having a diameter which is greater than the diameter of the second reeling surface (62).

12. A device as claimed in claim 11, in which the 15 first pulley (30) is rotatably mounted round said longitudinal axis and connected to a spring means (33), which by rotation of the first pulley (30) in one direction is adapted to act to rotate the pulley (30) in the opposite direction.

13. A device as claimed in claim 11 or 12, in which 20 the first pulley (30) supports a first circular flange (40) which is radially extended perpendicular from said first reeling surface (42) and which together with an end portion (36), connected thereto, of the first pulley (30) forms an end (35) of the first pulley (30), a through first slot (43) being formed in said end (35), said slot 25 (43) extending radially from the periphery of the flange (40) to said first reeling surface (42) and subsequently extending along an arc towards the centre for defining a tongue (44) in said end portion (36).

30 14. A device as claimed in any one of claims 11-13, in which the second pulley (31) comprises a pin (47) supporting said second reeling surface (62), said pin (47) being at one end preferably releasably connected to the first pulley (30) and at its other end supporting a 35 circular flange (48).

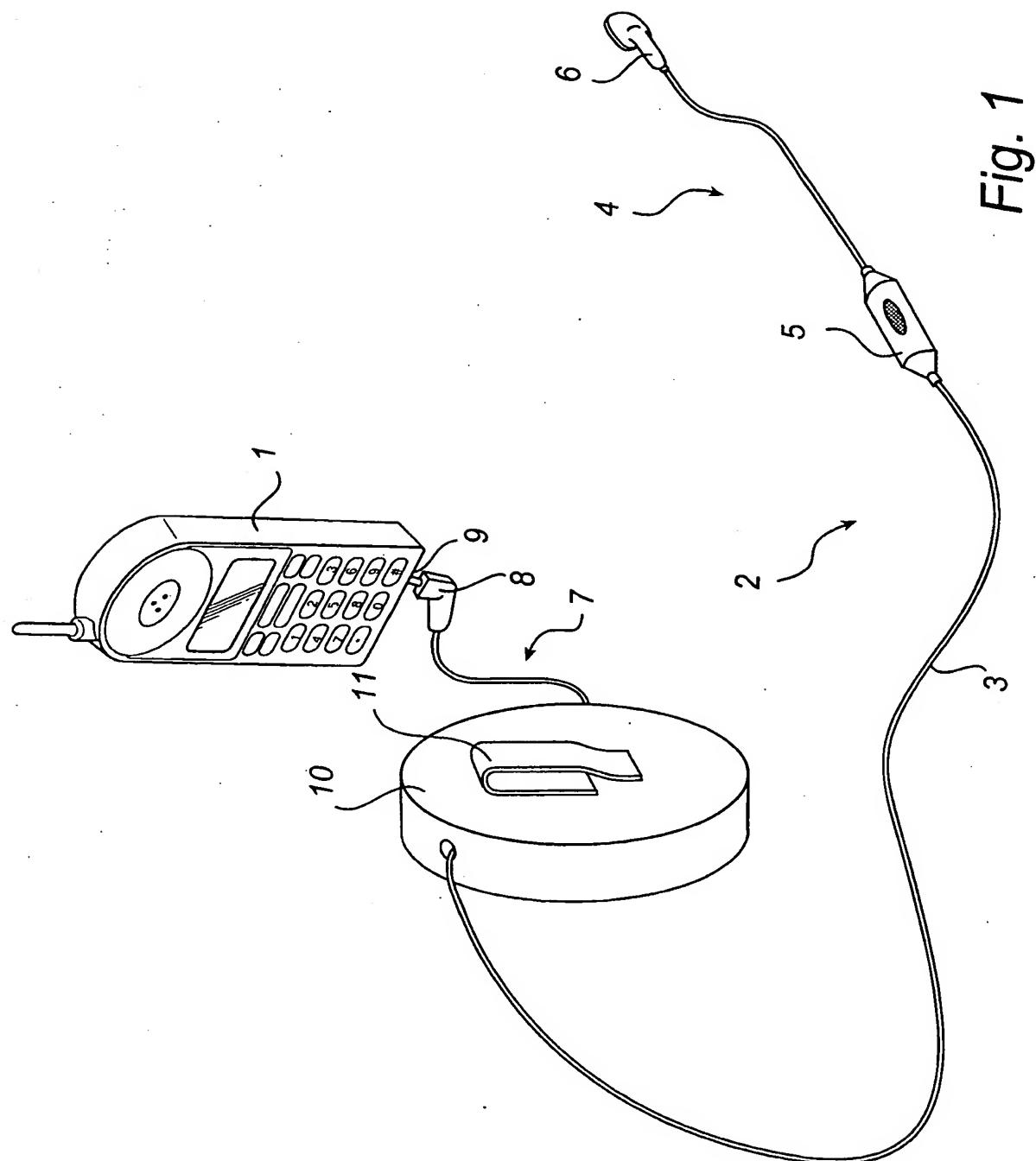
15. Use of a device as claimed in any one of claims 1-14 as a carrier for advertisements, which is applied to an external face of the casing (10).

16. An accessory for a mobile phone (1), comprising
5 a device as claimed in any one of claims 1-14 and hands-free equipment (2), the hands-free equipment (2) comprising a wire extended between a first wire end (4) and a second wire end (7), a mouthpiece (5) and an earpiece (6) being arranged at the first wire end (4) and a means (8)
10 for communication with the mobile phone (11) being arranged at the second wire end (7).

17. An accessory as claimed in claim 16, wherein
said means (8) for communication with the mobile phone
15 (1) comprises a contact means (8) which is connectable to
a complementarily formed contact means (9) of said mobile
phone (1).

18. An accessory as claimed in claim 16, wherein
said means (8) for communication with the mobile phone
20 (1) is intended for wireless communication with said
mobile phone (1).

1/10



2/10

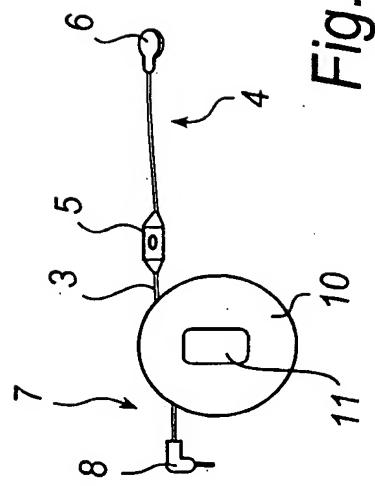


Fig. 2a

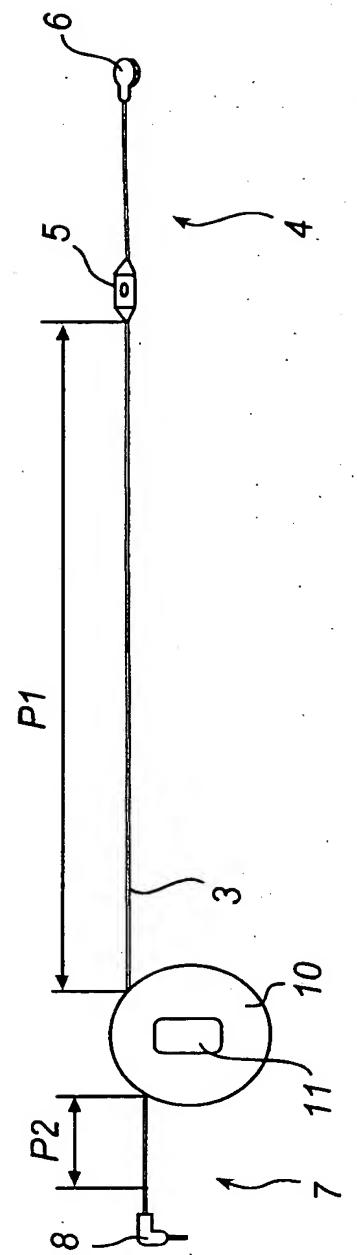


Fig. 2b

3/10

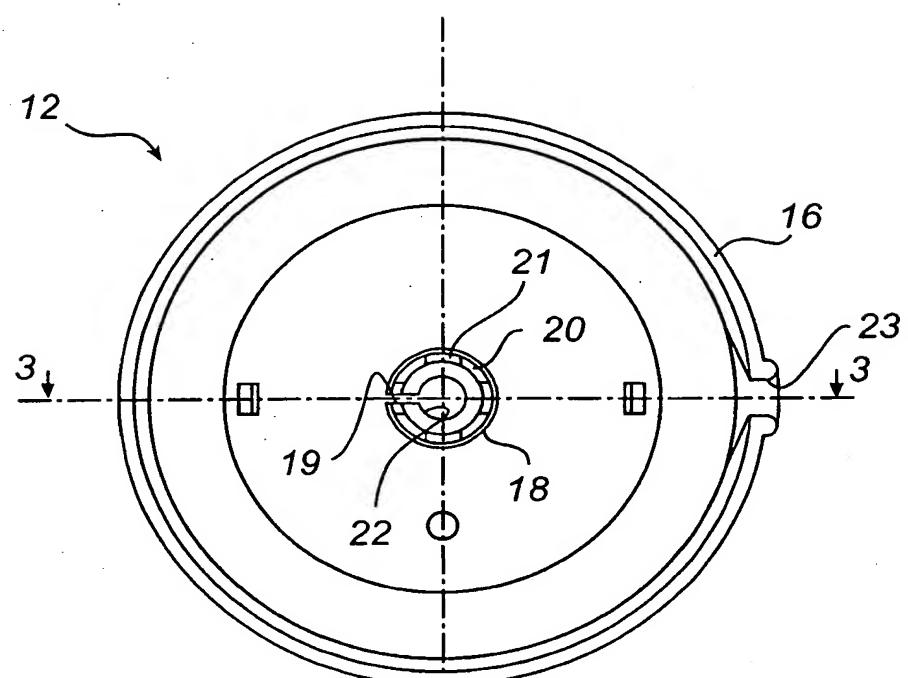


Fig. 3

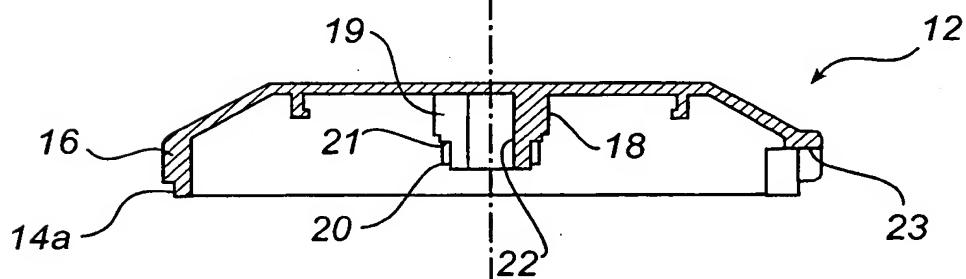
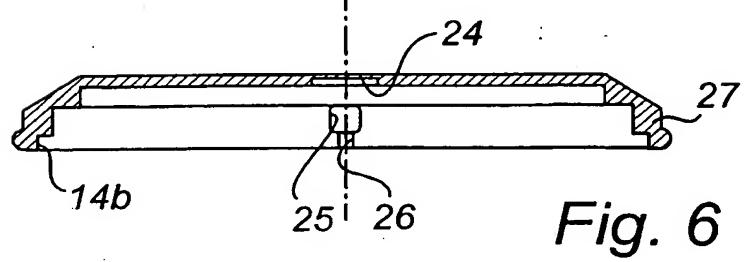
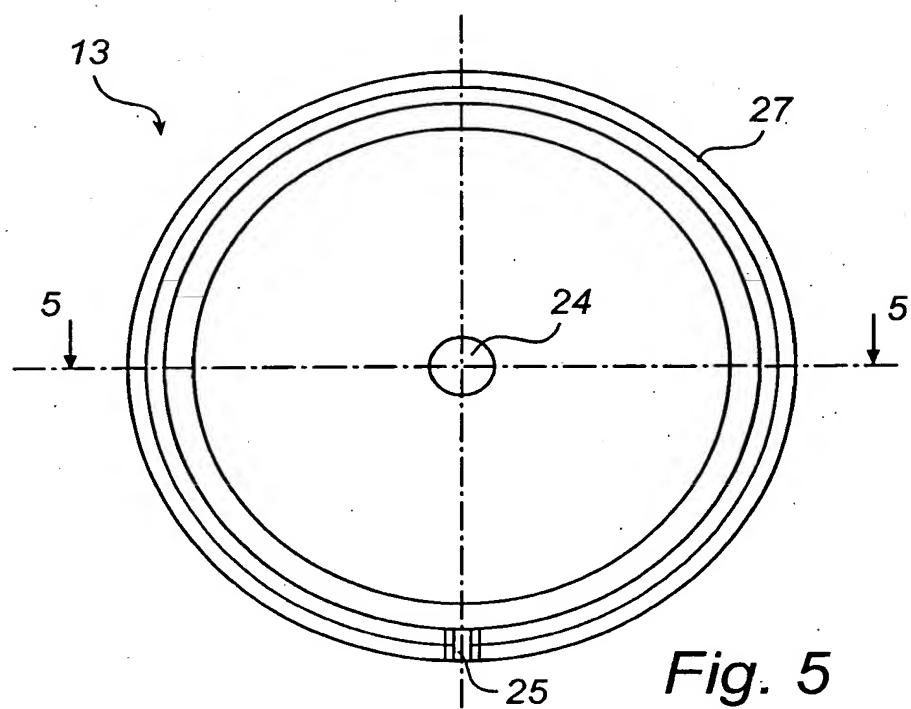


Fig. 4

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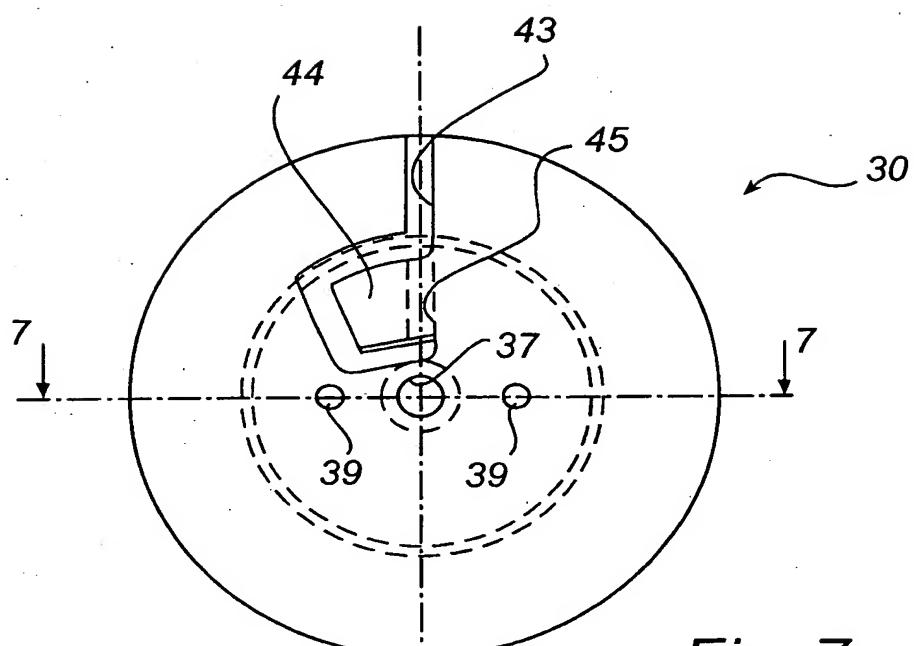


Fig. 7

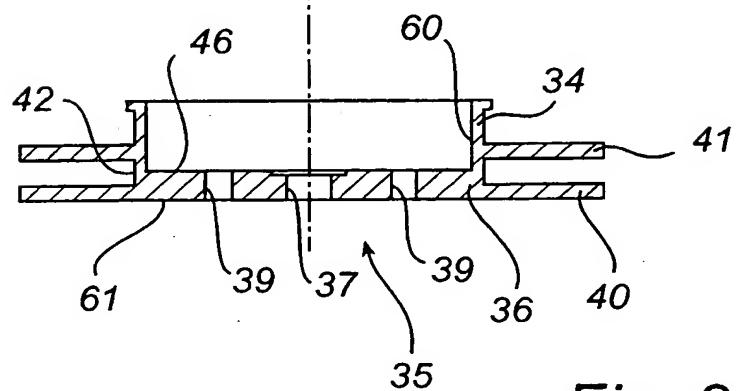
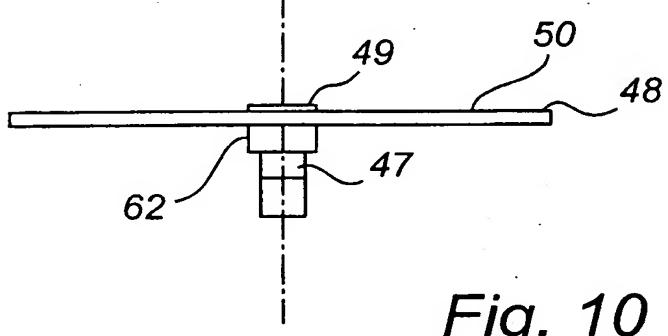
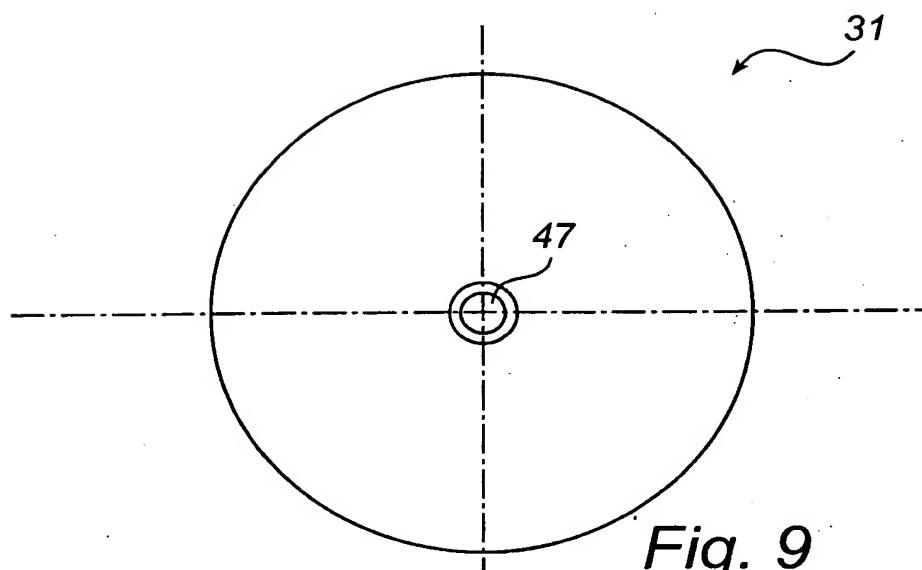


Fig. 8

6/10



7/10



Fig. 13

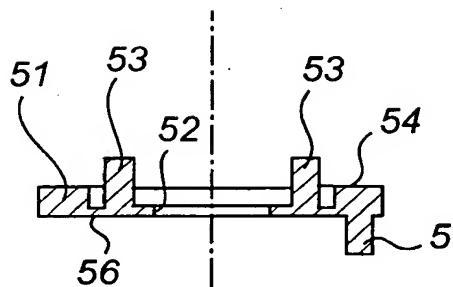


Fig. 12

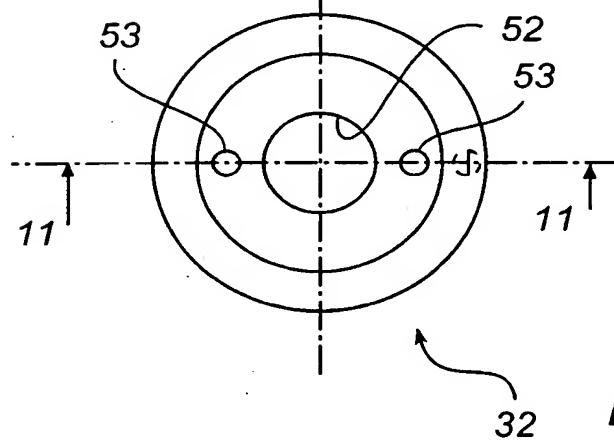


Fig. 11

8/10

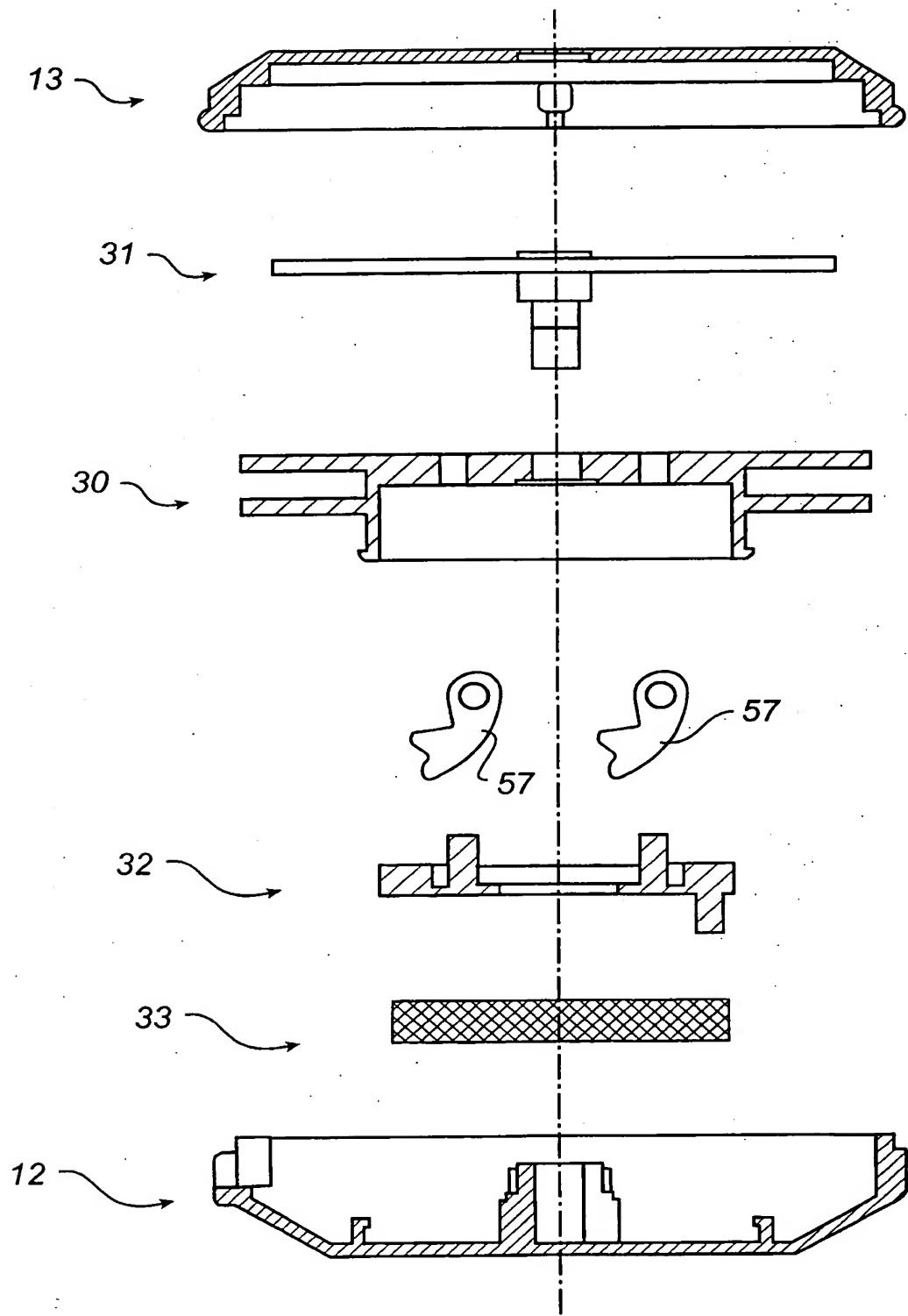


Fig. 14

9/10

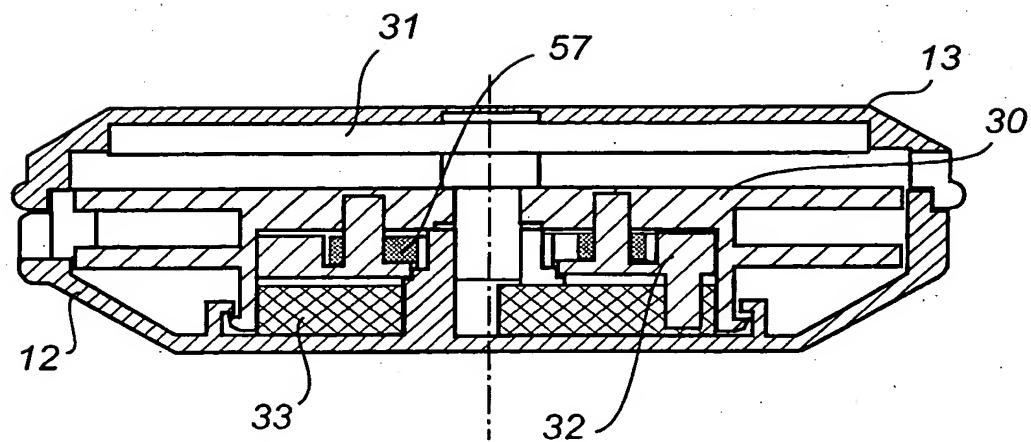


Fig. 15

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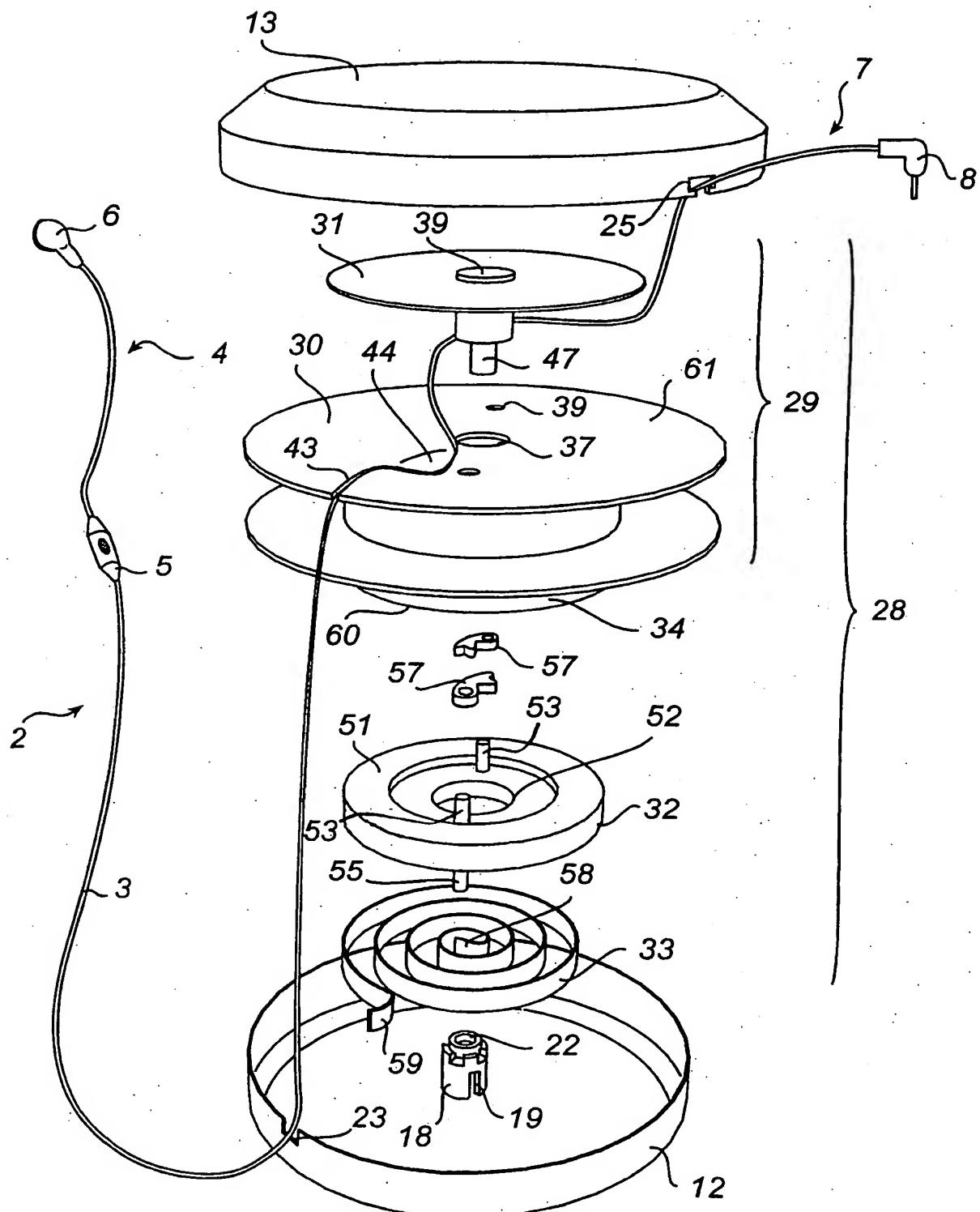


Fig. 16

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/00428

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/15, H02G 11/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H02G, H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5684883 A (T. CHEN), 4 November 1997 (04.11.97), column 1, line 54 - column 3, line 13, figures 2-8, 10 --	1-18
A	US 4942617 A (M. BOYLAN), 17 July 1990 (17.07.90), column 1, line 65 - column 3, line 7, figures 1-6, abstract --	1,2,6,7,10, 15-18
A	US 5544836 A (I.E. PERA), 13 August 1996 (13.08.96), column 9, line 11 - column 10, line 24, figures 16-20 --	1,2,4,6,7, 10,15-18

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

Date of mailing of the international search report

22 May 2001

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/00428

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4646987 A (E.R. PETERSON), 3 March 1987 (03.03.87), column 1, line 25 - line 38; column 1, line 63 - column 2, line 21, figures 1-4 --	1,2,4,6,7, 10,15-18
A	US 5600719 A (C.S. LOVECKY ET AL), 4 February 1997 (04.02.97), column 1, line 66 - column 2, line 40; column 3, line 41 - line 60; column 4, line 12 - line 33, figures 1-11 -- -----	1,2,6,7,10, 15-18

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE 01/00428

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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US 4646987 A	03/03/87	NONE		
US 5600719 A	04/02/97	BR CA CN DE FR GB GB HK JP	9502944 A 2152095 A 1124428 A 19523178 A 2721763 A,B 2290777 A,B 9512931 D 1008710 A 8172718 A	23/01/96 28/12/95 12/06/96 04/01/96 29/12/95 10/01/96 00/00/00 00/00/00 02/07/96